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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/684,359	10/15/2003	Masashi Suenaga	117514	3364

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EXAMINER	
SHEN, KEZHEN	

ART UNIT	PAPER NUMBER
2627	

MAIL DATE	DELIVERY MODE
01/08/2008	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/684,359	SUENAGA ET AL.	
	Examiner	Art Unit	
	Kezhen Shen	2627	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *6/1/2007*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5, 7-14, 27 and 29-30* is/are pending in the application.

4a) Of the above claim(s) *20,21 and 24-26* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5, 7-14, 27 and 29-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-5, 7-14, 27, 29 and 30 and rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 1, Applicant cited support for amendment of claim in paragraphs [0012], [0058] to [0068] and Figs. 3 and 8, however Examiner disagrees. The applicant has shown support for the first, second and third grooves as originally claimed, however there is no support for the two third grooves as amended. While the applicant does disclose a fourth groove in the cited paragraphs which can construed as a second third groove, however there is a difference in groove location of what is claimed and what is in the specifications.

Regarding claim 8, Applicant cited support for amendment of claim in paragraphs [0026], [0069] to [0080] and Figs. 13 and 14, however Examiner disagrees. The applicant has shown support for the first, second and third grooves as originally claimed, however there is no support for the two first grooves and two second grooves as amended.

Regarding claim 27, Applicant cited support for amendment of claim in paragraphs [0094] to [0098] and Figs. 11 and 12, however Examiner disagrees. The applicant has shown support for the first, second and third grooves as originally claimed, however there is no support for the two first grooves and two second grooves as amended.

Claims 2-5, 7, 9-14, 29 and 30 are dependent on claims 1, 8 and 27 and therefore are also rejected on the grounds of new matter.

Claim Objections

3. Claim 29 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Regarding claim 29, Applicant originally had claim 29 depend on claim 28, however claim 28 has now been canceled. Examiner recommends amending the claim to clearly explain what the values W_{gb} and W_g represents as claimed in the canceled claim 28.

Response to Arguments

4. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to Applicant's argument that Suzuki teaches the grooves are widened, not the pits, the Examiner agrees that Suzuki does not specifically teach the pits widened along with the grooves, however one of ordinary skill in the art would of found it obvious to increase the pit sizes as the groove size increases for the benefit of maintaining

In response to Applicant's argument that Suzuki teaches specific arrangement of the first groove, the second groove and the third groove, however Rilum does. One of ordinary skill in the art would be obvious to combine both teachings as a whole for the purpose of stabilizing the signal (Suzuki [0011]-[0013]).

In response to Applicant's argument that Suzuki does not teach the advantage of the groove arrangement, the Examiner disagrees. Suzuki does disclose the advantage of stabilizing the push-pull signal (Suzuki [0011]-[0013]).

In regards to the new matter added, if the Applicant decides to remove the new matter in claims 1, 8 and 27 then the previous Office Action still applies as a prior art rejection. The previous Office Action is restated here for Applicant's convenience.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 1-19 and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rilum et al. (US 7,054,260 B2) further in view of Suzuki et al. (JP 2002-237100, machine translation is included).

Regarding Claim 1, Rilum et al. teach an optical information-recording medium comprising a substrate (substrate 350, see figure 22) which is formed with a plurality of lands and grooves (see figure 20), and a recording layer (dye layer 355, see figure 22) and a reflective layer (reflective layer 355, see figure 22) which are provided on the substrate, the grooves including: a first groove (groove 311, see figure 20); a second groove which is formed with pits (groove 321, see figure 20); and a third groove which is formed with pits (groove 320, see figure 20), wherein: the third groove is arranged between the first groove and the second groove. Rilum et al. differ from the claimed invention in that they do not specifically show the third groove has pits with widths narrower than those of the pits of the second groove.

Suzuki et al. on the other hand teach width of grooves/pits increasing from the inner circumference to the periphery of the substrate (see page 3, paragraph [0012], lines 1-2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to change the width of the groove/pits in the system of Rilum et al. since Suzuki et al. teach that using such different size grooves prevents errors due to push pull signal and record sensibility (see page 3, paragraph [0011], lines 6-10 and paragraph [0012], lines 1-4).

Regarding Claim 2, as applied to claim 1 above, Suzuki et al. also teach $W_g \leq W_{pb} \leq W_p$ is satisfied provided that W_g represents a half value width of the first

groove, W_p represents a half value width of the pit of the second groove, and W_{pb} represents a half value width of the pit of the third groove. Suzuki et al. shows the grooves on which the pits are formed have half-value widths increasing from inner to the outside periphery; see example 1 on page 9 and table 1.

Regarding Claim 3, as applied to claim 1 above, Suzuki et al. also teach $T_g \leq T_{pb} \leq T_p$ is satisfied provided that T_g represents a recording layer recess depth ranging from an interface between the recording layer and the reflective layer over a surface of the land to an interface between the recording layer and the reflective layer over the first groove, T_p represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the pit of the second groove, and T_{pb} represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the pit of the third groove. Suzuki et al. shows the depths are increasing in succession from inner to outside periphery; see page 5, paragraph [0024], lines 4-9 and table 1.

Regarding Claim 4, the combination of Rilum et al. and Suzuki et al. teach the limitations of claim 1 for the reasons discussed above. The combination of Rilum et al. and Suzuki et al. differ from the claimed invention in that they do not specifically disclose the ratio of the first pit and the second pit is in a range of $1 \leq W_2/W_1 \leq 1.2$ where W_1 represents a maximum width in a radial direction of the substrate of the first pit, and W_2 represents a maximum width in the radial direction of the substrate of the second pit.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set the ratio the first pit and the second pit in a range of $1 \leq W2/W1 \leq 1.2$, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, In re Aller, 105 USPQ 233.

Regarding Claim 5, as applied to claim 1 above, Suzuki et al. also teach that the recording layer is formed of a dye (organic coloring matter; see page 1, paragraph [0001], lines 1-2).

Regarding Claim 6, as applied to claim 5 above, Suzuki et al. also teach each of the first groove, the second groove, and the third groove is formed so that a groove depth is successively deepened and a groove width is successively widened in a direction from an inner side to an outer side of the optical information-recording medium (the channel depth and/or groove width increases towards the periphery from the inner circumference; see page 3, paragraph [0012], lines 1-3).

Regarding Claim 7, the combination of Rilum et al. and Suzuki et al. teach the limitations of claim 2 for the reasons discussed above. The combination of Rilum et al. and Suzuki et al. differ from the claimed invention in that they do not specifically disclose a ratio W_p/W_{pb} between the half value width W_p and the half value width W_{pb} satisfies a range of $1.05 \leq W_p/W_{pb} \leq 1.15$.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set the ratio W_p/W_{pb} between the half value width W_p and the half value width W_{pb} within 1.05-1.15, since it has been held that where the general

conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, In re Aller, 105 USPQ 233.

Regarding Claim 8, Rilum et al. teach an optical information-recording medium comprising a substrate (substrate 350, see figure 22) which is formed with a plurality of lands and grooves (see figure 20), and a recording layer (dye layer 355, see figure 22) and a reflective layer (reflective layer 355, see figure 22) which are provided on the substrate, the grooves including: a first groove (groove 310, see figure 20); a second groove (groove 311, see figure 20); and a third groove which is formed with pits (groove 320, see figure 20), wherein: the second groove is arranged between the first groove and the third groove (see figure 20). Rilum et al. differ from the claimed invention in that they do not specifically show the second groove has a width wider than that of the first groove.

Suzuki et al. on the other hand teach width of grooves/pits increasing from tile inner circumference to the periphery of the substrate (see page 3, paragraph [0012], lines 1-2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to change the width of the groove in the system of Rilum et al. since Suzuki et al. teach that using such different size grooves prevents errors due to push pull signal and record sensibility (see page 3, paragraph [0011], lines 6-10 and paragraph [0012], lines 1-4).

Regarding Claim 9, as applied to claim 8 above, Suzuki et al. also teach $W_g \leq W_{pb} \leq W_p$ is satisfied provided that W_g represents a half value width of the first groove, W_{gb} represents a half value width of the pit of the second groove, and W_p

represents a half value width of the pit of the third groove, and. Suzuki et al. shows the grooves on which the pits are formed have half-value widths increasing from inner to the outside periphery; see example 1 on page 9 and table 1.

Regarding Claim 10, as applied to claim 9 above, Suzuki et al. also teach the ratio W_{gb}/W_g between the half value width W_{gb} and the half value width W_g satisfies $1.05 \leq W_p/W_{pb} \leq 1.15$. Suzuki et al. disclose in table 1, sample 1 with half width of second groove 153 nm and half width of first groove 145 nm which gives a ratio of 153/145=1.055.

Regarding Claim 11, as applied to claim 8 above, Suzuki et al. also teach $T_g \leq T_{pb} \leq T_p$ is satisfied provided that T_g represents a recording layer recess depth ranging from an interface between the recording layer and the reflective layer over a surface of the land to an interface between the recording layer and the reflective layer over the first groove, T_{gb} represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the second groove, and T_p represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the pit of the third groove. Suzuki et al. shows the depths are increasing in succession from inner to outside periphery; see page 5, paragraph [0024], lines 4-9 and table 1.

Regarding Claim 12, the combination of Rilum et al. and Suzuki et al. teach the limitations of claim 8 for the reasons discussed above. The combination of Rilum et al.

and Suzuki et al. differ from the claimed invention in that they do not specifically disclose the ratio of the first pit and the second pit is in a range of $1 \leq W_2/W_1 \leq 1.2$ where W_1 represents a maximum width in a radial direction of the substrate of the first pit, and W_2 represents a maximum width in the radial direction of the substrate of the second pit.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set the ratio the first Pit and the second pit in a range of $1 \leq W_2/W_1 \leq 1.2$, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, In re Aller, 105 USPQ 233.

Regarding Claim 13, as applied to claim 8 above, Suzuki et al. also teach that the recording layer is formed of a dye (organic coloring matter; see page 1, paragraph [0001], lines 1-2).

Regarding Claim 14, as applied to claim 13 above, Suzuki et al. also teach that the dye is an azo dye (see page 7, paragraph [0033], lines 1-4 and 7-9).

Regarding Claim 15, as applied to claim 13 above, Suzuki et al. also teach each of the first groove and the third groove is formed so that a groove depth is continuously deepened and a groove width is continuously widened in a direction from an inner side to an outer side of the optical information-recording medium (the channel depth and/or groove width increases towards the periphery from the inner circumference; see page 3, paragraph [0012], lines 1-3).

Regarding Claim 16, as applied to claim 15 above, Suzuki et al. also teach that $W_{gi} \leq W_{go} \leq W_{gb} \leq W_p$ is satisfied provided that W_{gi} represents a half value width of the first

groove positioned on the inner side of the optical information-recording medium, W_{go} represents a half value width of the first groove positioned on the outer side of the optical information-recording medium, W_{gb} represents a half value width of the second groove, and W_p represents a half value width of the pit of the third groove. Suzuki et al. shows the grooves on which the pits are formed have half-value widths increasing from inner to the outside periphery; see example 1 on page 9 and table 1.

Regarding Claim 17, the combination of Rilum et al. and Suzuki et al. teach the limitations of claim 16 for the reasons discussed above. The combination of Rilum et al. and Suzuki et al. differ from the claimed invention in that they do not specifically disclose .the ratio W_{go}/W_{gi} between the half value width W_{gi} and the half value width W_{go} is in the range of $1.03 \leq W_{go}/W_{gi} \leq 1.10$.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set the ratio W_{go}/W_{gi} in the range of 1.03-1.10, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, In re Aller, 105 USPQ 233.

Regarding Claim 18, the combination of Rilum et al. and Suzuki et al. teach the limitations of claim 15 for the reasons discussed above. The combination of Rilum et al. and Suzuki et al. differ from the claimed invention in that they do not specifically disclose the ratio d_{go}/d_{gi} is in the range of $1.00 \leq d_{go}/d_{gi} \leq 1.10$where d_{gi} is the depth of the first groove positioned on the inner side of the optical information-recording medium

from a substrate surface, and d_{go} is the depth of the first groove positioned on the outer side of the optical information-recording medium from the substrate surface.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set the ratio d_{go}/d_{gi} in the range of 1.00-1.10, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, In re Aller, 105 USPQ 233.

Regarding Claim 19, as applied to claim 15 above, Suzuki et al. also teach that $T_{gi}=T_{go}<T_{gb}<T_p$ is satisfied where T_{gi} represents a recording layer recess depth ranging from an interface between the recording layer and the reflective layer over a surface of the land to an interface between the recording layer and the reflective layer over the first groove positioned on the inner side of the optical information-recording medium, T_{go} represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the first groove positioned on the outer side of the optical information-recording medium, T_{gb} represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the second groove, and T_p represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the pit of the third groove. Note that Suzuki et al. teach the channel

depth is increasing successively from the inner circumference to the periphery; see page 3, paragraph [0012], lines 1-3, example 1 on page 9 and table 1.

Regarding Claim 27, Rilum et al. teach an optical information-recording medium comprising a substrate (substrate 350, see figure 22) which is formed with a plurality of lands and grooves (see figure 20), and a recording layer (dye layer 355, see figure 22) and a reflective layer (reflective layer 355, see figure 22) which are provided on the substrate, the grooves including: a first groove (groove 310, see figure 20); a second groove (groove 311, see figure 20); a third groove which is formed with pits (groove 321, see figure 20), and a fourth groove which is formed with pits (groove 321, see figure 20), wherein: the first to fourth grooves are arranged in an order of the first groove, the second groove, the fourth groove, and the third groove. Rilum et al. differ from the claimed invention in that they do not specifically show that the second groove has a width wider than that of the first groove and that the fourth groove has pits with widths narrower than those of the pits of the third groove.

Suzuki et al. on the other hand teach width of grooves/pits increasing from the inner circumference to the periphery of the substrate (see page 3, paragraph [0012], lines 1-2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to change the width of the groove/pits in the increasing order in the system of Rilum et al. since Suzuki et al. teach that using such different size grooves/pits prevents errors due to push pull signal and record sensibility (see page 3, paragraph [0011], lines 6-10 and paragraph [0012], lines 1-4).

Regarding Claim 28, as applied to claim 27 above, Suzuki et al. also teach that $W_g \leq W_{gb} \leq W_{pb} \leq W_p$ is satisfied provided that W_g represents a half value width of the first groove, W_{gb} represents a half value width of the second groove, W_p represents a half value width of the third groove, and W_{pb} represents a half value width of the fourth groove (the channel depth and/or groove width increases towards the periphery from the inner circumference; see page 3, paragraph [0012], lines 1-3).

Regarding Claim 29, the combination of Rilum et al. and Suzuki et al. teach the limitations of claim 28 for the reasons discussed above. The combination of Rilum et al. and Suzuki et al. differ from the claimed invention in that they do not specifically disclose the ratio W_{gb}/W_g is in the range of $1.03 \leq W_{gb}/W_g \leq 1.15$.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set the ratio W_{gb}/W_g in the range of 1.03-1.15, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, In re Aller, 105 USPQ 233.

Regarding Claim 30, as applied to claim 27 above, Suzuki et al. also teach that the recording layer is formed of a dye (organic coloring matter; see page 1, paragraph [0001], lines1-2).

Regarding Claim 31, as applied to claim 30 above, Suzuki et al. also teach each of the first groove, the third groove, and the fourth groove is formed so that a groove depth is successively deepened and a groove width is successively widened in a direction from an inner side to an outer side of the optical information-recording medium

(the channel depth and/or groove width increases towards the periphery from the inner circumference; see page 3, paragraph [0012], lines 1-3).

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kezhen Shen whose telephone number is (571) 270-1815. The examiner can normally be reached on Monday - Friday 8:30 am to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dwayne Bost can be reached on (571) 272-7023. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kezhen Shen/

TAN DINH
PRIMARY EXAMINER

11/03/08

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-5, 7-14, 27, 29 and 30 and rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 1, Applicant cited support for amendment of claim in paragraphs [0012], [0058] to [0068] and Figs. 3 and 8, however Examiner disagrees. The applicant has shown support for the first, second and third grooves as originally claimed, however there is no support for the two third grooves as amended. While the applicant does disclose a fourth groove in the cited paragraphs which can construed as a second third groove, however there is a difference in groove location of what is claimed and what is in the specifications.

Regarding claim 8, Applicant cited support for amendment of claim in paragraphs [0026], [0069] to [0080] and Figs. 13 and 14, however Examiner disagrees. The applicant has shown support for the first, second and third grooves as originally claimed, however there is no support for the two first grooves and two second grooves as amended.

Regarding claim 27, Applicant cited support for amendment of claim in paragraphs [0094] to [0098] and Figs. 11 and 12, however Examiner disagrees. The applicant has shown support for the first, second and third grooves as originally claimed, however there is no support for the two first grooves and two second grooves as amended.

Claims 2-5, 7, 9-14, 29 and 30 are dependent on claims 1, 8 and 27 and therefore are also rejected on the grounds of new matter.

Claim Objections

3. Claim 29 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Regarding claim 29, Applicant originally had claim 29 depend on claim 28, however claim 28 has now been canceled. Examiner recommends amending the claim to clearly explain what the values W_{gb} and W_g represents as claimed in the canceled claim 28.

Response to Arguments

4. In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

In response to Applicant's argument that Suzuki teaches the grooves are widened, not the pits, the Examiner agrees that Suzuki does not specifically teach the pits widened along with the grooves, however one of ordinary skill in the art would of found it obvious to increase the pit sizes as the groove size increases for the benefit of maintaining

In response to Applicant's argument that Suzuki teaches specific arrangement of the first groove, the second groove and the third groove, however Rilum does. One of ordinary skill in the art would be obvious to combine both teachings as a whole for the purpose of stabilizing the signal (Suzuki [0011]-[0013]).

In response to Applicant's argument that Suzuki does not teach the advantage of the groove arrangement, the Examiner disagrees. Suzuki does disclose the advantage of stabilizing the push-pull signal (Suzuki [0011]-[0013]).

In regards to the new matter added, if the Applicant decides to remove the new matter in claims 1, 8 and 27 then the previous Office Action still applies as a prior art rejection. The previous Office Action is restated here for Applicant's convenience.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claim 1-19 and 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rilum et al. (US 7,054,260 B2) further in view of Suzuki et al. (JP 2002-237100, machine translation is included).

Regarding Claim 1, Rilum et al. teach an optical information-recording medium comprising a substrate (substrate 350, see figure 22) which is formed with a plurality of lands and grooves (see figure 20), and a recording layer (dye layer 355, see figure 22) and a reflective layer (reflective layer 355, see figure 22) which are provided on the substrate, the grooves including: a first groove (groove 311, see figure 20); a second groove which is formed with pits (groove 321, see figure 20); and a third groove which is formed with pits (groove 320, see figure 20), wherein: the third groove is arranged between the first groove and the second groove. Rilum et al. differ from the claimed invention in that they do not specifically show the third groove has pits with widths narrower than those of the pits of the second groove.

Suzuki et al. on the other hand teach width of grooves/pits increasing from the inner circumference to the periphery of the substrate (see page 3, paragraph [0012], lines 1-2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to change the width of the groove/pits in the system of Rilum et al. since Suzuki et al. teach that using such different size grooves prevents errors due to push pull signal and record sensibility (see page 3, paragraph [0011], lines 6-10 and paragraph [0012], lines 1-4).

Regarding Claim 2, as applied to claim 1 above, Suzuki et al. also teach $Wg \leq Wpb \leq Wp$ is satisfied provided that Wg represents a half value width of the first

groove, Wp represents a half value width of the pit of the second groove, and Wpb represents a half value width of the pit of the third groove. Suzuki et al. shows the grooves on which the pits are formed have half-value widths increasing from inner to the outside periphery; see example 1 on page 9 and table 1.

Regarding Claim 3, as applied to claim 1 above, Suzuki et al. also teach $Tg \leq Tpb \leq Tp$ is satisfied provided that Tg represents a recording layer recess depth ranging from an interface between the recording layer and the reflective layer over a surface of the land to an interface between the recording layer and the reflective layer over the first groove, Tp represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the pit of the second groove, and Tpb represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the pit of the third groove. Suzuki et al. shows the depths are increasing in succession from inner to outside periphery; see page 5, paragraph [0024], lines 4-9 and table 1.

Regarding Claim 4, the combination of Rilum et al. and Suzuki et al. teach the limitations of claim 1 for the reasons discussed above. The combination of Rilum et al. and Suzuki et al. differ from the claimed invention in that they do not specifically disclose the ratio of the first pit and the second pit is in a range of $1 \leq W2/W1 \leq 1.2$ where W1 represents a maximum width in a radial direction of the substrate of the first pit, and

W2 represents a maximum width in the radial direction of the substrate of the second pit.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set the ratio the first pit and the second pit in a range of $1 \leq W2/W1 \leq 1.2$, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, In re Aller, 105 USPQ 233.

Regarding Claim 5, as applied to claim 1 above, Suzuki et al. also teach that the recording layer is formed of a dye (organic coloring matter; see page 1, paragraph [0001], lines 1-2).

Regarding Claim 6, as applied to claim 5 above, Suzuki et al. also teach each of the first groove, the second groove, and the third groove is formed so that a groove depth is successively deepened and a groove width is successively widened in a direction from an inner side to an outer side of the optical information-recording medium (the channel depth and/or groove width increases towards the periphery from the inner circumference; see page 3, paragraph [0012], lines 1-3).

Regarding Claim 7, the combination of Rilum et al. and Suzuki et al. teach the limitations of claim 2 for the reasons discussed above. The combination of Rilum et al. and Suzuki et al. differ from the claimed invention in that they do not specifically disclose a ratio Wp/Wpb between the half value width Wp and the half value width Wpb satisfies a range of $1.05 \leq Wp/Wpb \leq 1.15$.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set the ratio Wp/Wpb between the half value width Wp and the half value width Wpb within 1.05-1.15, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, In re Aller, 105 USPQ 233.

Regarding Claim 8, Rilum et al. teach an optical information-recording medium comprising a substrate (substrate 350, see figure 22) which is formed with a plurality of lands and grooves (see figure 20), and a recording layer (dye layer 355, see figure 22) and a reflective layer (reflective layer 355, see figure 22) which are provided on the substrate, the grooves including: a first groove (groove 310, see figure 20); a second groove (groove 311, see figure 20); and a third groove which is formed with pits (groove 320, see figure 20), wherein: the second groove is arranged between the first groove and the third groove (see figure 20). Rilum et al. differ from the claimed invention in that they do not specifically show the second groove has a width wider than that of the first groove.

Suzuki et al. on the other hand teach width of grooves/pits increasing from tile inner circumference to the periphery of the substrate (see page 3, paragraph [0012], lines 1-2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to change the width of the groove in the system of Rilum et al. since Suzuki et al. teach that using such different size grooves prevents errors due to push pull signal and record sensibility (see page 3, paragraph [0011], lines 6-10 and paragraph [0012], lines 1-4).

Regarding Claim 9, as applied to claim 8 above, Suzuki et al. also teach Wg≤Wpb≤Wp is satisfied provided that Wg represents a half value width of the first groove, Wgb represents a half value width of the pit of the second groove, and Wp represents a half value width of the pit of the third groove, and. Suzuki et al. shows the grooves on which the pits are formed have half-value widths increasing from inner to the outside periphery; see example 1 on page 9 and table 1.

Regarding Claim 10, as applied to claim 9 above, Suzuki et al. also teach the ratio Wgb/Wg between the half value width Wgb and the half value width Wg satisfies 1.05≤Wp/Wpb≤1.15. Suzuki et al. disclose in table 1, sample 1 with half width of second groove 153 nm and half width of first groove 145 nm which gives a ratio of 153/145=1.055.

Regarding Claim 11, as applied to claim 8 above, Suzuki et al. also teach Tg≤Tpb≤Tp is satisfied provided that Tg represents a recording layer recess depth ranging from an interface between the recording layer and the reflective layer over a surface of the land to an interface between the recording layer and the reflective layer over the first groove, Tgb represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the second groove, and Tp represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the pit of the third

groove. Suzuki et al. shows the depths are increasing in succession from inner to outside periphery; see page 5, paragraph [0024], lines 4-9 and table 1.

Regarding Claim 12, the combination of Rilum et al. and Suzuki et al. teach the limitations of claim 8 for the reasons discussed above. The combination of Rilum et al. and Suzuki et al. differ from the claimed invention in that they do not specifically disclose the ratio of the first pit and the second pit is in a range of $1 \leq W2/W1 \leq 1.2$ where W1 represents a maximum width in a radial direction of the substrate of the first pit, and W2 represents a maximum width in the radial direction of the substrate of the second pit.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set the ratio the first Pit and the second pit in a range of I_ W1 1.2, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, In re Aller, 105 USPQ 233.

Regarding Claim 13, as applied to claim 8 above, Suzuki et al. also teach that the recording layer is formed of a dye (organic coloring matter; see page 1, paragraph [0001], lines 1-2).

Regarding Claim 14, as applied to claim 13 above, Suzuki et al. also teach that the dye is an azo dye (see page 7, paragraph [0033], lines 1-4 and 7-9).

Regarding Claim 15, as applied to claim 13 above, Suzuki et al. also teach each of the first groove and the third groove is formed so that a groove depth is continuously deepened and a groove width is continuously widened in a direction from an inner side

to an outer side of the optical information-recording medium (the channel depth and/or groove width increases towards the periphery from the inner circumference; see page 3, paragraph [0012], lines 1-3).

Regarding Claim 16, as applied to claim 15 above, Suzuki et al. also teach that $Wgi \leq Wgo \leq Wgb \leq Wp$ is satisfied provided that Wgi represents a half value width of the first groove positioned on the inner side of the optical information-recording medium, Wgo represents a half value width of the first groove positioned on the outer side of the optical information-recording medium, Wgb represents a half value width of the second groove, and Wp represents a half value width of the pit of the third groove. Suzuki et al. shows the grooves on which the pits are formed have half-value widths increasing from inner to the outside periphery; see example 1 on page 9 and table 1.

Regarding Claim 17, the combination of Rilum et al. and Suzuki et al. teach the limitations of claim 16 for the reasons discussed above. The combination of Rilum et al. and Suzuki et al. differ from the claimed invention in that they do not specifically disclose .the ratio Wgo/Wgi between the half value width Wgi and the half value width Wgo is in the range of $1.03 \leq Wgo/Wgi \leq 1.10$.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set the ratio Wgo/Wgi in the range of 1.03-1.10, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, In re Aller, 105 USPQ 233.

Regarding Claim 18, the combination of Rilum et al. and Suzuki et al. teach the limitations of claim 15 for the reasons discussed above. The combination of Rilum et al. and Suzuki et al. differ from the claimed invention in that they do not specifically disclose the ratio dgo/dgi is in the range of 1.00≤dgo/dgi≤1.10where dgi is the depth of the first groove positioned on the inner side of the optical information-recording medium from a substrate surface, and dgo is the depth of the first groove positioned on the outer side of the optical information-recording medium from the substrate surface.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set the ratio dgo/dgi in the range of 1.00-1.10, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, In re Aller, 105 USPQ 233.

Regarding Claim 19, as applied to claim 15 above, Suzuki et al. also teach that Tgi=Tgo<Tgb<Tp is satisfied where Tgi represents a recording layer recess depth ranging from an interface between the recording layer and the reflective layer over a surface of the land to an interface between the recording layer and the reflective layer over the first groove positioned on the inner side of the optical information-recording medium, Tgo represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the first groove positioned on the outer side of the optical information-recording medium, Tgb represents a recording layer recess depth ranging from the interface between the

recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the second groove, and Tp represents a recording layer recess depth ranging from the interface between the recording layer and the reflective layer over the surface of the land to an interface between the recording layer and the reflective layer over the pit of the third groove. Note that Suzuki et al. teach the channel depth is increasing successively from the inner circumference to the periphery; see page 3, paragraph [0012], lines 1-3, example 1 on page 9 and table 1.

Regarding Claim 27, Rilum et al. teach an optical information-recording medium comprising a substrate (substrate 350, see figure 22) which is formed with a plurality of lands and grooves (see figure 20), and a recording layer (dye layer 355, see figure 22) and a reflective layer (reflective layer 355, see figure 22) which are provided on the substrate, the grooves including: a first groove (groove 310, see figure 20); a second groove (groove 311, see figure 20); a third groove which is formed with pits (groove 321, see figure 20), and a fourth groove which is formed with pits (groove 321, see figure 20), wherein: the first to fourth grooves are arranged in an order of thefirst groove, the second groove, the fourth groove, and the third groove. Rilum et al. differ from the claimed invention in that they do not specifically show that the second groove has a width wider than that of the first groove and that the fourth groove has pits with widths narrower than those of the pits of the third groove.

Suzuki et al. on the other hand teach width of grooves/pits increasing from the inner circumference to the periphery of the substrate (see page 3, paragraph [0012],

lines 1-2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to change the width of the groove/pits in the increasing order in the system of Rilum et al. since Suzuki et al. teach that using such different size grooves/pits prevents errors due to push pull signal and record sensibility (see page 3, paragraph [0011], lines 6-10 and paragraph [0012], lines 1-4).

Regarding Claim 28, as applied to claim 27 above, Suzuki et al. also teach that $Wg \leq Wgb \leq Wpb \leq Wp$ is satisfied provided that Wg represents a half value width of the first groove, Wgb represents a half value width of the second groove, Wp represents a half value width of the third groove, and Wpb represents a half value width of the fourth groove (the channel depth and/or groove width increases towards the periphery from the inner circumference; see page 3, paragraph [0012], lines 1-3).

Regarding Claim 29, the combination ofRilum et al. and Suzuki et al. teach the limitations of claim 28 for the reasons discussed above. The combination of Rilum et al. and Suzuki et al. differ from the claimed invention in that they do not specifically disclose the ratio Wgb/Wg is in the range of $1.03 \leq Wgb/Wg \leq 1.15$.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to set the ratio Wgb/Wg in the range of 1.03-1.15, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art, In re Aller, 105 USPQ 233.

Regarding Claim 30, as applied to claim 27 above, Suzuki et al. also teach that the recording layer is formed of a dye (organic coloring matter; see page 1, paragraph [0001], lines1-2).

Regarding Claim 31, as applied to claim 30 above, Suzuki et al. also teach each of the first groove, the third groove, and the fourth groove is formed so that a groove depth is successively deepened and a groove width is successively widened in a direction from an inner side to an outer side of the optical information-recording medium (the channel depth and/or groove width increases towards the periphery from the inner circumference; see page 3, paragraph [0012], lines 1-3).

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kezhen Shen whose telephone number is (571) 270-1815. The examiner can normally be reached on Monday - Friday 8:30 am to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dwayne Bost can be reached on (571) 272-7023. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Kezhen Shen/